

Chemical Change

- The starting materials are called reactants and the new materials produced are called products.

REACTANTS → PRODUCTS

Broken Twig

Physical change.



Branch + Force → Broken Branch.



Chemical Change

- Here are some other examples of chemical changes:

Raw egg becomes cooked egg

chemical. ← No



Egg + Heat → Fried Egg

Cake mix becomes cake

chemical.



Steel becomes rust

chemical.



Metal + Oxygen → Rust
Reactants Products



Your Turn



Chemical or Physical Changes

Chemical or Physical ?

Physical

Cutting a piece of wood.



Chemical or Physical ?

Physical!

Chewing of food



if digested → (chem.)

Chemical or Physical ?

Chemical

Rusting Nail



Chemical or Physical ?

Physical!

Ice Melting



Solid-liquid-gas.

Chemical or Physical ?

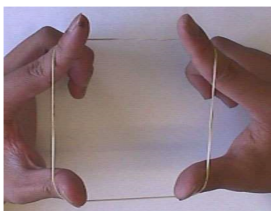
Chemical!

Burning a Match



Chemical or Physical ?

Physical Stretching a Rubber Band



Chemical or Physical ?

Physical Breaking a Stick



Chemical or Physical ?

Chemical Tarnishing Silver

Shiny Luster → *dull discolored yellow tarnished.*



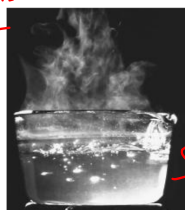
Chemical or Physical ?

Chemical Ripening Tomatoes





Chemical or Physical ?


Physical Water Boiling




Atoms are made out of three basic particles:

 **Protons** - carry a positive charge

 **Neutrons** - carry no charge

 Protons and Neutrons join together to form the Nucleus - the central part of the atom

 **Electrons** - carry a negative charge and circle the nucleus

Click on a particle to learn more about it

 **Fun Facts**

taken from: <http://education.jlab.org/atomtour/listofparticles.html>

Electrons

- Negatively charged (-)
- Almost have no mass ($1/1836^{\text{th}}$ mass of protons & neutrons)
- Located around the outside of the nucleus

Proton

- Same mass as neutrons
- Positively charged (+)
- Located in center of atom (nucleus)
- Number of protons in an atom is equal to the element's atomic number.

Neutron

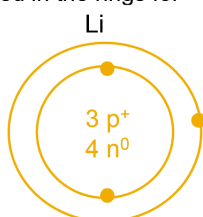
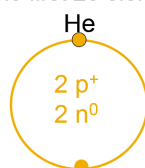
- Same mass as proton
- No charge
- Located in nucleus
- Number per atom may vary – but is similar to number of protons

Bohr's Planetary Model of the Atom

- Bohr suggested that:
- Electrons move around the nucleus in circular paths called **orbits**, like planets around the sun.
- Each electron has a definite amount of energy.
- The order of filling of electrons in the first three orbits is 2, 8, 8.
- Electrons are more stable when they are at the lower energy.

Bohr - Rutherford Diagrams

- Find the # of protons, neutrons, and electrons
- Draw protons (p^+), (n^0) in circle (i.e. "nucleus")
- Draw electrons around in shells - 2,8,8 are the numbers of electrons allowed in the rings for the first 20 elements



Lewis Dot Diagrams

- Used to easily show the outer level electrons (valence electrons) of atoms.

Step 1: Determine the valence electrons

Group 1 - 1	15 - 5
2 - 2	16 - 6
13 - 3	17 - 7
14 - 4	18 - 8

outside Ring

+1 Alkaline Earth. Metals. when there are 2 / Roman #5.

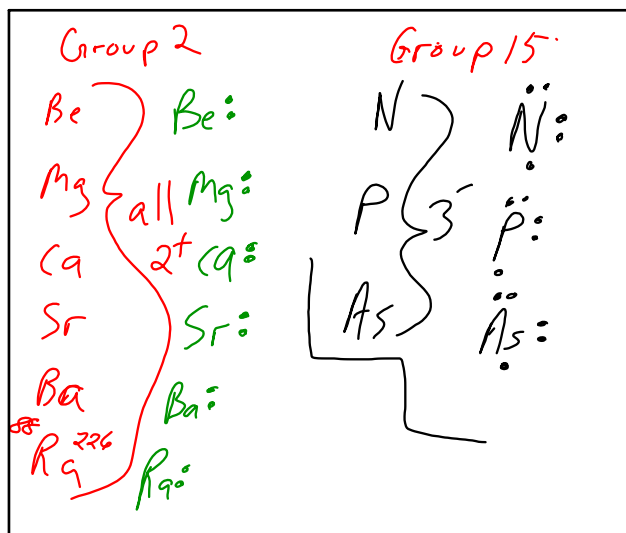
Lithium Li • electrons

Sodium Na • in the

Potassium K • outside

Rubidium Rb • Ring

Cesium Cs • Valence.



Sep 19-9:02 AM

■ Step 2: Write the element symbol and a dot for each valence electron.

*** each side can hold 2 valence electrons.
They go in one at a time before pairing up.

ex Group 17.

At →

The Periodic Table

[illegible]

- Elements are arranged to help us to explain and predict physical and chemical properties.

■ Period – elements in the same row; rows are numbered from top to bottom

■ Family – elements in the same column; these elements have similar properties

Columns
Groups.

Rows.

if in the same group
or Row they share...

Know a little about each

Elemental Families:

- tend to have similar chemical and physical properties

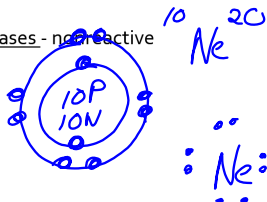
1. Alkali Metals – shiny, silvery metals, compounds soluble in water

2. Alkaline Earth Metals – shiny, silvery metal, compounds insoluble in water

3. Transition Metals – center columns

4. Halogens – non-metals, react readily with alkali metals

5. Noble Gases – non-reactive



Alkali Metals

■ The elements that occupy the far left column of the periodic table are called Alkali Metals.

■ Called Group 1 elements

■ These elements are extremely reactive.

Why? only 1 electron to give.

Alkali Earth Metals

■ Found in group 2.

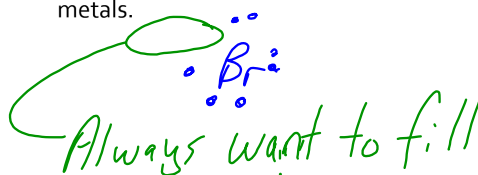
■ Form compounds that are often insoluble in water.

Halogens

■ Halogens occupy the 17th column of the periodic table. (F, Cl, Br, I, At)

■ These elements are the most reactive non-metals.

■ All halogens are poisonous elements that react readily with sodium and other alkali metals.



Metalloids

- Metalloids are elements that possess both metallic and nonmetallic properties.
- They are found in different groups on the far right side of the periodic table.
- Examples: Silicon, boron, germanium, arsenic, selenium, antimony, tellurium, polonium, and astatine are all metalloids.

Found on the stair case

Noble Gases

■ Noble Gases are the elements that occupy the far right column of the periodic table. (He, Ne, Ar, Kr, Xe, Rn)

Also Called inert gases because Noble gases generally do not form compounds.

* All gases at room temperature.

Test? **Properties of Metals and Non Metals**

METALS	NON METALS
<ul style="list-style-type: none">ShinyMalleableConductorsMost of them react with acidMostly solids	<ul style="list-style-type: none">DullBrittleMostly insulatorsDo not react with acidSolids, liquids and gases at room temperature.